MEMORANDUM

SUBJECT: Univar Corporation, Wichita Ks.

FROM: William F. Lowe
ARTD/RCAP

THROUGH: Scott Marquess
Manager RCAP

TO: Art Spratlin, ARTD

Attached for your approval is the Statement of Basis (SB) with EPA's proposed corrective actions for the Univar facility. The selection of this remedy was based on information contained in the approved RCRA Facility Investigation (RFI), a risk assessment, and an approved Corrective Measures Study Report.

This facility is located in south Omaha. Adjacent areas contain industrial, commercial, and residential properties. The off-site groundwater plume flows beneath both residential and commercial neighborhoods. Groundwater depth varies from about 70' below ground at the site to about 120' below ground at the nearest residences to discharge seeps at Spring Lake Park, approximately 3 miles east of the site.

The RFI identified groundwater and soils as the EPA's media of concern at the facility. Soils on-site are contaminated, in separate areas, with pesticides and chlorinated volatile organics constituents (CVOC). Groundwater is contaminated with CVOCs only. There are no current complete pathways for exposure to this contamination. Contaminated groundwater is 70' to 120' below ground and based on indoor air modeling, should not pose a threat to indoor air. No groundwater is currently being used and Omaha has prohibitions against developing groundwater for use in the future. Groundwater discharges through seeps in a hillside adjacent to a city park, but based on monitoring near the park, contaminants have not reached those discharge points to date. Since the facility began operations in the early 1950s, it appears that natural attenuation has been effective in retarding contaminant movement to the park. All soil contamination is on-site and access to the facility is limited by a gate and fence. In addition, prior to the facility investigation, Univar placed a Permalon (plastic sheeting) cover over all exposed soil.

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RCAP	RCAP
LOWE	MARQUESS
WFL 4/25/03	SM 4/28/03

The remedies are designed for plume containment and to prevent complete exposure pathways. For groundwater, the remedies consist of installing a groundwater extraction/treatment system in the source area to stop the spread of contaminated groundwater, however, some contaminant removal will be a secondary benefit. Monitored natural attenuation will be relied upon to control off-site groundwater and ongoing monitoring will evaluate the effectiveness of this remedy and ensure that contamination does not reach the seeps in the park. For soils, an engineered cap is proposed to isolate contaminated soil and to reduce infiltration of precipitation that would continue to wash contaminants into groundwater. This remedy, in addition to institutional controls for property transfer, access, construction, etc. should eliminate exposure to contaminated soil as well as ongoing soil to groundwater transfer of contamination.

To date, we have met several times with the South Omaha Neighborhood Association and the Spring Lake Park Association. Results of the RFI and CMS have been presented to these associations and they seem satisfied with this proposal.

The SB, which has been peer reviewed in RCAP, CNSL, OEP, and NDEQ, has a more detailed discussion of the RFI findings and the corrective actions that were evaluated. Upon approval of the SB, copies of it will be added to the Administrative Record and a public notice, targeted for April 30, 2003, with a forty five day comment period, will be issued. If you have any questions please contact me at ext. 7547.

Attachment

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION VII
901 NORTH 5TH STREET
KANSAS CITY, KANSAS 66101

MEMORANDUM

SUBJECT: Univar Corporation, Wichita Ks.

FROM: William F. Lowe *William F. Lowe*
ARTD/RCAP

REC'D
APR 29 2003
RCAP

THROUGH: Scott Marquess
Manager RCAP

TO: Art Spratlin, ARTD

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Attachment

EPA Region 7

Statement of Basis for Univar Corporation, Buckingham Place Facility Omaha, Nebraska EPA Identification # NED986375327

I. INTRODUCTION

The Buckingham Place Facility (Facility) is located at 4120 Buckingham Place in the southern portion of the City of Omaha in Douglas County, Nebraska (Figure 1). This location is 41^0 13' 07"north latitude and 95^0 57'' 20" west longitude. The Facility is located on a roughly rectangular property that covers approximately 2 acres.

In April of 1993, the U. S. Environmental Protection Agency Region 7 (EPA) and Univar Corporation (Univar) entered into an Order on Consent (AOC) according to Section 3008 (h) of the Resource Conservation and Recovery Act (RCRA), 42 U.S.C. § 6928(h). The AOC, among other things, required Univar to:

- Submit, to EPA, a Current Conditions Report (CCR) summarizing past and present Facility operations;

- Conduct a RCRA Facility Investigation (RFI) to determine the horizontal and vertical extent of contamination in soil, sediment, surface water, and groundwater, and;

- Prepare a Corrective Measures Study (CMS) to evaluate potential cleanup activities should contaminants be discovered at levels of concern during the investigation.

This Statement of Basis describes the proposed corrective measure (hereinafter the "proposed remedy") for the Facility. This document serves as a companion document to the RFI, CMS, and other information as documented in the Administrative Record. For more detailed information, please see the Administrative Record at the locations listed at the end of this document.

This document also:

- Identifies EPA's proposed remedies for addressing contaminated groundwater and soil due to releases from past Facility operating practices;

• Explains the reasons the proposed remedies were selected for public comment ;

• Summarizes the past operational history and current conditions of the Facility;

• Summarizes other remedies that were considered;

• Provides information on how the public can be involved in the remedy selection process; and

•Solicits public review of, and comment on all alternatives, including any not previously studied.

EPA is providing this document as part of EPA's public involvement regulatory requirements under RCRA.

EPA will approve a remedy for implementation at the facility only after the public comment period has ended, all comments have been reviewed, and responses have been prepared to address the public's comments. EPA may change the proposed remedy or select another remedy based on new information or comments received from the public during the public comment period. A public hearing has not been scheduled, but one will be offered if sufficient public interest exists.

II. PROPOSED REMEDY

There are three proposed remedies, one for contaminated soil and two for contaminated groundwater. The proposed remedy to address *off site* groundwater contamination is monitored natural attenuation. Over time, natural processes tend to remove contamination from groundwater. These processes include, dilution (fresh water mixing with contaminated water), adsorption (the tendency for contaminants to adhere permanently to soil particles), and biological degradation (the use of the contaminants as a food source by microbes). Groundwater quality will be periodically measured using a system of wells. Sampling these wells will ensure that contaminants in groundwater, which were caused by Univar's past operations, do not move to groundwater discharge points at levels above drinking water Maximum Contaminant Levels (MCLs). Maximum contaminant levels are the maximum levels of hazardous waste allowed to be present in the drinking water. They were established pursuant to the Safe Drinking Water Act, 42 U.S.C. §§ 300f-300j-26,and set forth at 40 C.F.R. Part 141. The proposed remedy addressing *on-site* contaminated groundwater at the Facility is groundwater extraction (pumping), treatment, and disposal.

The proposed remedy for contaminated soils is to build and maintain an engineered cover (cap) over the contaminated areas. Univar will also be required to establish institutional controls which include notification of the presence of contaminated soil and restrictions on digging in the areas of contamination. The cap will prevent unintentional human contact with contaminated soil and reduce the potential for precipitation to cause additional contamination to move to groundwater.

III. FACILITY BACKGROUND AND CURRENT CONDITIONS

Prior to 1954, the Facility was used as a railroad yard. In 1954, the Warren Douglas Chemical Company (WDCC), a chemical blender and distributor, acquired the properties located north (the current Van Waters & [VWR] Rogers 3002 F Street Facility) and south (the Facility) of F Street. (Figure 2). From 1954 through 1980, WDCC carried out its operations at both properties. The acids, bases, pesticides, and industrial solvents handled by WDCC were stored in bulk, blended and repackaged at the Facility.

Specifically, WDCC conducted the following operations: (1) repackaging of mineral acids and solvents; (2) blending of various paint thinners; (3) blending of disinfectants, insecticides, and other agricultural chemicals; (4) blending of mineral oils and feed additives for the agricultural industry; and (5) solvent reclamation. The agricultural chemicals blended at the Facility included aldrin, heptachlor, and pentachlorophenol. The solvents reclaimed at the Facility included acetone, carbon tetrachloride, alcohols, and naphtha. There is no documentation regarding the volume or composition of the waste stream from the Facility prior to 1980.

Univar, VWR's parent company, acquired the Facility from WDCC by merger in 1980. Upon acquisition of the Facility, VWR eliminated the blending and repackaging of pesticides that had been performed by WDCC. However, VWR continued to stock prepackaged pesticides for resale; the prepackaged pesticides were stored in a dedicated warehouse at the portion of the Facility located north of F Street.

From 1980 to 1989 VWR's repackaging process generally consisted of transferring chemicals from bulk storage tanks into smaller containers. The chemicals from bulk storage tanks were pumped through fixed piping into the repackaging areas. Flexible hoses with stainless-steel filling wands were generally used to transfer the chemicals from the fixed pipes to the individual containers. A scale was used to determine when the containers had been filled to the predetermined weight. The repackaging areas at the Facility included the former corrosive repack/office building, Warehouses No. 1 and No. 2, the former solvent storage building, and the former shed (Figure 3). The waste stream from the repackaging process was comprised of approximately 2,500 gallons per week of corrosive washwater. The washwater was neutralized and discharged to the sanitary sewer.

In 1989, VWR stopped operations at the Facility and transferred its chemical distribution operations to a newly constructed Facility located immediately north of F Street (the current VWR F Street Facility). In 1990 and 1991, VWR transferred ownership of the Facility to Univar. Univar demolished the existing structures and disposed of the debris.

In 1996, Vopak USA acquired VWR/Univar, but the operations remained unchanged. The name was changed to Univar USA in 2002.

Current Use and Activities
Currently, the Facility is used only as an access route to the VWR Facility.

IV. SUMMARY OF FACILITY RISKS

The contaminated material and list of Constituents of Concern (COCs) were identified and developed in the RFI and are shown on Table 1. The contaminated materials and COCs are:

- organochlorine pesticides in shallow soil;
- chlorinated volatile organics (CVOCs) in soil and;
- CVOCs in groundwater.

Organochlorine pesticide contaminated soil is limited to an area in the southwestern portion of the Facility (Figure 4). Shallow soil (0-2 feet deep) was found to contain the highest pesticide concentrations. Pesticide concentrations declined substantially with increasing depth. Only trace concentrations were detected at depths greater than 12 feet below the ground surface. Aldrin and dieldrin were the most frequently detected pesticides. The estimated total volume of soil contaminated with pesticides at concentrations above the cleanup standards (Table 1) is approximately 2,100 cubic yards. Of this total, approximately 700 cubic yards are covered by concrete foundations with the remainder covered by a Permalon liner. The area not covered by concrete foundations is nearly entirely covered with asphalt.

The highest CVOC concentrations detected in soil were in the northwestern part of the Facility (Figure 4). The highest CVOC concentrations were detected at depths of 12 feet or less, but concentrations above media cleanup levels extend to the depth of the water table. The frequency and magnitude of detected CVOC concentrations generally decreased with increasing depth.

Chemical concentrations that are considered representative of the average concentration to which an individual might be exposed over an extended period were estimated using soil analytical data. Areas of the Facility that contribute most significantly to the overall long-term risk were identified by comparing the representative concentration for each of the COCs to criteria prescribed by EPA for an on-site adult industrial worker. The on-site adult industrial worker criteria are also protective of a short-term construction/utility worker. The area of soil that requires corrective action to attain an acceptable risk level is located in the southwestern part of the Facility. The sum of target risk levels of 1×10^{-5} (with risks for individual constituents not exceeding 3×10^{-6}) and hazard index of 1 were used for carcinogenic and noncarcinogenic chemicals, respectively. Pesticides, particularly aldrin and dieldrin, have been detected in soil at concentrations that may pose an unacceptable health risk to people exposed to contaminated soil in this area. Exposure could occur if the existing Permalon liner were removed at some point in the future and workers incidentally ingested, came into contact with, or inhaled dust.

Organochlorine pesticides in soil are not likely to pose a risk to groundwater. This observation is based on the distribution of these chemicals in soil, the relatively great distance to the water table, the length of time the chemicals have had to migrate, and their relative immobility in soil. Groundwater monitoring data supports this conclusion

Representative concentrations for CVOCs are below the media cleanup standard with regard to ingestion and inhalation pathways. That is, the residual average concentration of a given CVOC or combination of CVOCs in soil does not pose an unacceptable risk to the health of construction workers or industrial workers. However, additional risk reduction would be achieved by addressing the two "hot spots" illustrated on Figure 4. These hot spots are characterized by soil contaminated with CVOCs at concentrations above the media cleanup standards. The estimated volume of soil in the uppermost 5 feet of loess (i.e., relatively accessible soil) in these two hot spots is approximately 260 cubic yards. Of this total, approximately 100 cubic yards are covered by the concrete foundation near monitoring wells MW4S and MW4I and approximately 160 cubic yards are not covered by concrete foundations.

However, CVOC-contaminated soil poses a risk to groundwater, as shown by groundwater monitoring data. Because the risk associated with CVOC-contaminated soil is related to migration to groundwater and subsequent migration of contaminated groundwater toward potential receptors, CVOCs in soil are addressed in conjunction with CVOCs in groundwater, in the following section.

In 1990, Univar took some preliminary measures to limit exposures to potentially contaminated soils while the site investigation was being conducted. These preliminary measures include:

- Removal of all aboveground structures;
- Installing a site security fence;
- Repair of the remaining surface concrete and;
- Capping of exposed soil with a Permalon liner and gravel cover

V. **Subsurface Lithology** (soils) **and Groundwater flow** (Figure 5).

The soils found beneath the Facility are described in the following paragraphs.

Loess: The uppermost geologic deposit is loess, a clayey silt-textured wind blown deposit that forms the bluffs in the Facility area. The potential for horizontal movement of water and air in the loess is very low. Water and air can move vertically through small cracks commonly associated with all loess deposits. The loess is approximately 65 feet thick at the Facility and gets thicker to the east.

S Stratified Unit: The texture of the S Stratified Unit varies across the Facility. In the southeast corner of the Facility, the unit is primarily composed of clayey silt with sand. This is in contrast to the texture of the same unit in the northwest corner of the Facility, where interbedded lenses of silt with sand, poorly graded sand, and gravel were observed.

Sand and gravel within the unit do not appear to be laterally extensive. The S Stratified Unit was not present in boreholes drilled southeast of the Facility, suggesting limited areal extent. The unit is saturated with groundwater at the Facility.

S Till: Lean clay-textured till was observed beneath and within the S Stratified Unit at nearly all drilling locations. Where the S Stratified Unit was absent, till was found directly underlying the loess. At the Facility the till unit is very thin, less than one foot in places, and may be discontinuous. This till unit is relatively thick southeast of the Facility. The till is below the water table.

I Sand: Poorly graded, medium to coarse-grained sand is present beneath the S Till. The I Sand crops out along the bluffs on the west side of the alluvial valley of the Missouri River and along streams incised into the bluffs that border the valley. The sand crops out east of the Facility on the south side of Spring Lake Park at elevations between 1,010 to 1,050 feet above mean sea level, compared to top and bottom elevations at the Facility of 1,030 to 1,060. This suggests a slight down-dip to the east. The unit was observed to be saturated.

Groundwater Flow

The groundwater flow conditions at and near the Facility are summarized as follows.

Loess: Saturated conditions were not observed in this unit at the Facility. Because of the low hydraulic conductivity of the unit, infiltration is very slow.

S Stratified Unit: A free groundwater surface has been identified in the permeable portions of this unit, at a depth of approximately 60 feet below the ground surface. There is a downward potential based on comparison of water levels in S unit wells compared to I Sand Unit wells. Seasonal fluctuation of the water level in the S Stratified Unit is approximately 6 feet based on data from MW4S. Permeable zones in this unit do not appear to be laterally extensive, suggesting limited potential for lateral flow. Monitoring wells installed in this unit do not readily yield groundwater. The S unit is not a usable groundwater resource because of its limited extent and low transmissivity.

S Till: This unit appears to confine hydraulic conditions in the underlying I Sand Unit. Water levels in the I Sand Unit are above the bottom of the S Till. Geochemical conditions in paired wells in the S Stratified Unit and I Sand (i.e., MW4S and MW4I) are distinctly different.

I Sand: The hydraulic conductivity of the unit is 0.009 cm/s based on slug tests. Seasonal fluctuation of water level in the I Sand Unit wells is approximately 4 feet. The Facility-wide hydraulic gradient is approximately 0.002, though regionally the hydraulic gradient is 0.005. This suggests variation in flow conditions between the Facility and points near the discharge location east of the Facility. Regional groundwater flow is toward the east-southeast and local flow direction, based on monitoring well water levels, matches the regional pattern. The I Sand Unit discharges where it crops out along the valley wall of the Missouri and along stream valley walls where the bluffs have been incised on the west side of the Missouri River valley, such as at Spring Lake Park. There is the potential for groundwater in the I Sand Unit to migrate into storm sewers and surface water bodies near Spring Lake Park. In addition, discharge might migrate into storm sewers and then flow to the Missouri River.

CVOCs in Groundwater

The COCs in groundwater include the following CVOCs:

- Carbon tetrachloride,
- 1,1-Dichloroethene,
- cis-1,2-Dichloroethene,
- Tetrachloroethene,
- 1,1,1-Trichloroethane,
- Trichloroethene (TCE).

Of these CVOCs, TCE has been observed at the highest concentration and has the largest areal extent in groundwater. TCE concentrations of up to 24 mg/L have been detected in groundwater at monitoring well MW4S, which is screened in the S Stratified Unit. The MCL for TCE is 0.005 mg/L. The lateral extent of TCE in the S Stratified Unit is relatively limited based on concentrations at MW1S and MW9S, which are two other S Stratified Unit wells located near MW4S. Univar conducted a hydraulic and geochemical evaluation of the S Stratified Unit that showed a decrease in TCE concentrations over time at MW4S, thought in part to be due to reductive dechlorination.

Concentrations of TCE in the underlying I Sand are approximately one to two orders of magnitude lower than those at MW4S. Approximately 700 feet downgradient of MW4S, at MW7I, the TCE concentration in the I Sand has been observed between 0.63 and 1.9 mg/L. There has been a decrease in TCE concentration over time at MW7I. No COCs were detected in groundwater collected from three piezometers (PZ1, PZ2, PZ3) screened in the I Sand Unit approximately one mile east-southeast of the Facility near Spring Lake Park (Figure 1). These PZ's were installed to ensure that contamination had not reached the springs in Spring Lake Park. There has however been TCE at 1 mg/L in MW-12I near the corner of 26th (Figure 1) and H Street approximately 1600 feet southeast of the Facility.

Contaminated groundwater constitutes a low long-term potential risk to human health. Groundwater is not currently used in this area. There is no planned groundwater development in the area, which has long been developed and is fully serviced by municipal water. The municipal water supply points are located far from the Facility and are not at risk of being affected by COCs from the Facility. In addition, groundwater development at the Facility and in the area downgradient of the Facility is restricted by the City of Omaha. Sample results indicate that there is no current exposure to groundwater COCs, from this Facility, at Spring Lake Park.

Based on existing data, the primary potential receptors for future migration of the plume of CVOC-contaminated groundwater are seeps (springs) near Spring Lake Park and the Missouri River. Some seeps near Spring Lake Park may contribute water to future recreational surface water bodies. The Missouri River is designated as a potential drinking water supply. The primary objective of the proposed corrective measure for groundwater will be to ensure that neither existing or future surface water bodies near Spring Lake Park nor the Missouri River becomes contaminated by the CVOC plume at concentrations above safe drinking water standards (MCLs).

Groundwater flow and chemical transport from the Facility toward the potential downgradient receptors was simulated using a groundwater model. Based on a conservative estimate of the fate and transport of CVOCs, contaminated groundwater should not reach surface water bodies near Spring Lake Park or the Missouri River before degradation and other natural attenuation processes reduce CVOC concentrations to below MCLs. There is no ecological risk associated with the Facility. The Facility is an urban setting, and no threatened or endangered species are present.

VI. SUMMARY OF ALTERNATIVES CONSIDERED

The following is a summary of treatment technologies and process options that have been evaluated. Details of the evaluations are contained in the CMS. The corrective measures technologies and process options evaluated in the CMS were first identified in the RFI and refined in the implementation of the CMS. Numerous technologies were considered. The technologies or process options that were rejected in the screening process were screened out based upon the following Facility-specific considerations:

- Physical characteristics of the environmental media;
- Chemical characteristics of the COCs;
- Distribution of the COCs and;
- Applicability of the technologies at the scale of the Facility.

For example, technologies utilizing an underground vacuum to extract COCs from subsurface environmental media were screened out because the clayey soil conditions would greatly limit the effectiveness of this technology. This permeability limitation applies to near-surface soil as well as deep soil and this was confirmed with pilot tests in the RFI as well as hydrologic tests during the CMS.

The technologies or process options that were retained through the screening process formed the basis for the corrective measure alternatives for soil and groundwater at the Facility. The retained technologies or process options were considered as stand-alone and as combined alternatives, whichever most efficiently addressed the media cleanup standards. Because of the complexities involved with evaluating corrective measures for groundwater (e.g., the number of possible combination of technologies and process options, and the complexity of Facility hydrogeologic conditions etc), corrective measure alternatives for groundwater were screened to reduce the number of alternatives subjected to detailed evaluation. All alternatives were screened using effectiveness, Implementability and cost considerations.

The list of corrective measure alternatives that were evaluated in detail is presented in Table 6 of the CMS.

SOIL CORRECTIVE MEASURE ALTERNATIVES

The following sections describe each alternative that was evaluated in detail. The description includes implementation approach, expected accomplishments, and potential advantages and disadvantages.

Soil No Further Action (SNFA)

No further action would require relying on the previously implemented preliminary remedial measures (IRMs) to provide sufficient protection of human health. Existing IRMs include a liner constructed over much of the Facility. At some locations, existing foundations and pavement prevent exposure to contaminated soil. There are no institutional controls to alert future landowners or construction workers to the presence of contaminated soil. The barrier was not designed for long-term effectiveness and there would be no monitoring or maintenance to assure long-term effectiveness of the barrier.

Construct Engineered Cover (ENG)

An engineered asphalt or concrete pavement cover would be installed over the area to be addressed and could be installed over the TCE hot spots. The Contaminated soil, liner, and existing pavements and foundations would remain in place. Institutional controls would be employed to reduce the potential for direct exposure to the Contaminated soil in the future. The engineered cover would be designed for long-term effectiveness and would be monitored and periodically maintained, as needed. The barrier would decrease infiltration through source zones limiting future COC transfer from soil to groundwater.

Institutional Controls (IC)

Institutional controls would include recording covenants, conditions, and restrictions with Douglas County, potentially including excavation restrictions, implementation of a risk management plan, restricting access with a physical barrier of some type, and signage.

Excavation and Off-Site Disposal (EXC)

This alternative involves the excavation of pesticide-contaminated soil. Excavation is digging up contaminated soil so it can be cleaned or disposed properly in a landfill. The soil is excavated using construction equipment, like backhoes or bulldozers. Near-surface soil could also be excavated from the TCE hot spots with the goal of achieving targeted risk reduction. Excavation as a stand-alone approach for VOC-contaminated soil, which would include deep soil, is precluded by the significant depth involved. Prior to excavation, existing concrete foundation material, asphalt and subpavement fill that currently overlies contaminated soil would be removed and disposed of off site. Next, contaminated soil would be removed with standard construction equipment and methods. The depth of excavation in the area has been estimated, based on available data, to be 2 to 4 feet, varying based on location. If the soil is cleaned, it may be used to backfill (returned to) the holes it came from, otherwise clean soil would be trucked in from off-site sources. Before backfilling, confirmation sampling would be conducted and the results would be used to recalculate a site-wide representative concentration for use in evaluating the attainment of media cleanup standards. If necessary, additional excavation would be conducted. Disposal and, potentially, pre-disposal treatment requirements would need to be addressed. One disadvantage to off-site disposal is that trucks loaded with contaminated soils would have to travel through surrounding neighborhoods when leaving the Facility.

Steam Stripping (SS)

In this alternative, soil excavated from the area to be addressed would be excavated and treated with steam stripping. This approach could also be applied to near-surface soil excavated from the TCE hot spots. Steam stripping would involve injecting the excavated soil with high velocity steam generated by a boiler. The steam would heat the soil to approximately 200 to 300 °F, volatilizing and thereby removing organochlorine pesticides and CVOCs. The resulting vapor would be condensed to a liquid and treated with liquid-phase granular activated carbon (GAC) filters. Treated water exiting the GAC filters would be pumped to the boiler for reuse. Vapor exiting the heat exchanger would flow through vapor-phase GAC filters and exhaust to the atmosphere.

Following treatment, excavated soil would be placed back into the excavation. A pilot study would be needed to confirm that residual COC concentrations have been reduced to concentrations below media cleanup standards.

Typical steam stripping systems are capable of treating only approximately 10 tons of contaminated soil per hour. At this rate, several months would be required to treat the contaminated soil at the Facility. The system requires a high amount of energy, which is a disadvantage compared to other alternatives. The community may be concerned about fugitive dust generation during earthwork and air discharges during steam stripping. Engineering controls, including dust control and vapor treatment would likely address these short-term health concerns.

Ex-Situ Chemical Oxidation (CO)

In this alternative, soil excavated from the area to be addressed would be treated. This approach could also be applied to near-surface soil excavated from the TCE hot spots. A chemical oxidant would be mixed with the soil to destroy organochlorine pesticides and CVOCs, reducing their concentration. The use of chemical oxidants to reduce the concentration of organochlorine pesticides in soil was bench tested as part of the CMS. The use of chemical oxidants to reduce the concentration of CVOCs in soil did not require testing because this is a proven approach.

During bench-scale testing, potassium permanganate ($KMnO_4$) removed up to 100 percent of aldrin, 35 to 65 percent of dieldrin, and 57 to 71 percent of alpha-chlordane, making this oxidant much more effective than hydrogen peroxide or Fenton's reagent. However, based on these observed percent removals, multiple applications of potassium permanganate would likely be needed to reduce chemical concentrations in the most highly contaminated soil at the Facility to concentrations below ten times the Universal Treatment Standards.

Effectively mixing the treatment solutions with the contaminated soil at the field scale would likely be a significant challenge during implementation of this alternative. Design and construction of the delivery system would likely constitute a significant portion of the implementation cost for this alternative.

It should also be noted that reduced metals could be oxidized during ex-situ chemical oxidation, which could increase the toxicity and mobility of some metals, such as chromium.

CORRECTIVE MEASURE ALTERNATIVES FOR GROUNDWATER

The following sections describe each alternative that was evaluated. The description includes implementation approach, expected accomplishments, and potential advantages and disadvantages.

Groundwater No Further Action (GWNFA)

No actions would be taken to address COCs in groundwater and no groundwater monitoring would be conducted. This alternative is utilized for benchmark comparison to the other alternatives.

Monitored Natural Attenuation (MNA)

Over time, natural processes tend to remove contamination from groundwater. These processes include, dilution (fresh water mixing with contaminated water), adsorption (the tendency for contaminants to adhere permanently to soil particles), and biological degradation (some microbes actually use the contaminant as a food source). Groundwater quality would be monitored (MNA) using a system of wells to assure that the contamination remaining in groundwater, which is attributable to Univars' past operations, does not reach receptors at levels of concern.

This alternative would utilize long-term groundwater monitoring, natural attenuation, and institutional controls to attain media cleanup standards. Natural processes appear to be reducing COC concentrations in groundwater over time, in both the source area and downgradient of the source area, based on observed geochemical conditions and simulations of groundwater flow.

Long-term monitoring of groundwater conditions, including hydraulic and geochemical conditions, would be conducted to verify short-term effectiveness and help assure long-term effectiveness of any remedy , including natural attenuation, initiated to control migration of CVOCs to address media cleanup standards.

Source control is a commonly required component of MNA when levels of contaminants in the source area are high enough to preclude biodegradation. At the Facility, the "source" is defined as the area at and in the immediate vicinity of MW4S, where groundwater concentrations are ten to a thousand times higher than in the surrounding S Unit and at downgradient locations. Containment is acceptable as a form of source control under site-specific circumstances.

On-Site Groundwater Extraction (pumping) and Treatment (PT)

Under this alternative, groundwater would be extracted from wells at the Facility to address media cleanup standards via active control of the hydraulic gradient. For the purpose of cost comparison, a preliminary design was developed that includes 3 extraction wells, each pumping at approximately 10 to 15 gallons per minute, and one new non-pumping observation well. Based on modeled simulations, this design should achieve containment in the short term and eventually achieve media cleanup standards. While the actual design may vary based on results of a pre-design pumping test, the preliminary design is considered acceptable for generating engineering cost estimates.

Reductive Dechlorination in the S Unit in the Source Area (RD)

This alternative would include in situ treatment of groundwater in the source area at and in the vicinity of MW4S. A reactive treatment zone utilizing zero-valent iron as the treatment media would be installed into the source area. A series of large diameter soil borings would be drilled into the S Unit, aligned in a fence-like or bowling pin-like array. The saturated portion of the borings would be filled with reactive media (zero-valent iron). Because the borings would have a greater permeability than the surrounding native aquifer, groundwater flow through the material would be enhanced by the permeability contrast. The overlapping array would provide a relatively continuous zone of treatment through which much of the flow would occur. Not all groundwater would be expected to pass through the reactive material; it would be impracticable to place the borings closely enough to achieve this result. The goal of this approach is to destroy CVOCs in the groundwater that flow directly through the reactive material and also create a local groundwater condition that would be highly reduced, have elevated dissolved hydrogen gas concentrations, and thus promote microbially–enhanced degradation of CVOCs in the adjacent aquifer material. This approach would not directly reduce mobility of the plume.

There would be monitoring costs associated with this approach. Additional reactive material may need to be emplaced in the future due to loss of surface reactivity over time, or due to plugging. For purposes of cost comparison, it was assumed that additional reactive material would be replaced on two occasions in the future. Because of the hydraulic limitations, this approach likely would take some time to reduce groundwater CVOC concentrations although the increase in reduction capacity and concentration of dissolved hydrogen gas in the aquifer material adjacent to the reactive borings would be immediate.

VII. EVALUATIONS OF PROPOSED REMEDY AND ALTERNATIVES

EPA has evaluated each of the corrective measure alternatives presented above and proposes alternatives EC (engineered cap) and IC (institutional controls) for soils.

For off site groundwater, EPA proposes alternatives (MNA) and for on site groundwater, the Agency proposes (PT). Monitoring will assure that contamination does not reach receptors and will confirm that the extraction system is working as designed. Groundwater extraction in the source area will speed up the rate of plume attenuation.

These remedies, and the other alternatives not chosen, have been evaluated against the following standards and selection factors:

STANDARDS FOR REMEDIES

1. Protection of Human Health and the Environment: All the alternatives, except SNFA and GWNFA reduce the risk by contaminated groundwater and contaminated soil. Although natural attenuation would proceed under GWNFA, there would be no way to ensure that contamination did not migrate.

2. Attainment of Cleanup Standards: Alternatives SNFA, IC, and GWMNA, alone will not attain cleanup standards. Alternatives EC, SS, CO, PT, and RD would be helpful in attaining cleanup standards in groundwater but would not reduce contaminant concentrations in soil. Alternative SS, and CO, may be effective for attaining cleanup standards. EXC will attain cleanup standards in shallow soils.

3. Controlling Source(s) of Release: Alternatives EC, EXC, SS, and CO, would all be effective for controlling source releases in soil. PT is the only engineered remedy that would be effective for controlling groundwater sources.

4. Compliance with Waste Management Standards: All remedies except SNFA and GWNFA could be made to comply with waste management standards.

REMEDY SELECTION FACTORS

In addition to the four standards above, the following factors were also considered in selecting the remedies EPA is proposing to the public.

1. Long-Term Reliability and Effectiveness: Alternatives SNF, IC, EXC, SS, and CO will provide long term reliability. MNA, PT, and RD could also provide long term reliability for groundwater contamination.

2. Reduction of Toxicity, Mobility or Volume of Contaminants: Alternatives EC, EXC, SS would reduce the mobility and/or the toxicity and volume of contaminated soils. PT, and RD could satisfy this factor to different degrees.

3. Short-Term Effectiveness: Alternatives EC, IC, and EXC could all be put into place relatively quickly and each would prove effective, but for different aspects of corrective action. For instance IC would effectively reduce mobility of contaminants thereby protecting groundwater but it would not reduce the toxicity or volume of contamination. EXC would eliminate toxicity, mobility, and reduce the volume of contaminated shallow soils, but it would not have an effect on deeper soil. PT and RD both will prove effective in the short term.

4. Implementability: To some extent, Alternatives EC and IC are already in place. The temporary cover and building foundations that exist act as a cover although a final

permanent cover would have to be designed and constructed. Existing fencing ,signage, and company policies are already in place to restrict access and exposures. MNA is already occurring based on on-going monitoring and an apparent reduction of contamination by natural processes.

5. **Cost** Alternatives SNFA and GWNFA, (no further action) are without cost but are removed from further consideration because they will not fulfill any remedy selection factors.

- Alternative EC (engineered cover) would cost about $550,000

- Alternative EXC (excavation and off-site disposal) would cost about $3,200,000

- Alternative SS (steam stripping) would cost about $1,200,000

- Alternative CO (ex-situ chemical oxidation) would cost about $950,000

- Alternative NA (monitored natural attenuation) would cost about $900,000

- Alternative PT (groundwater extraction and treatment) would cost about $3,400,000

- Alternative RD (reductive dechlorination) would cost about $1,400,000

CORRECTIVE ACTIONS SELECTED BY EPA FOR RECOMMENDATION TO THE PUBLIC

For soils, EPA is proposing construction of engineered covers (Figure 6) with institutional controls that restrict access to contaminated areas and require notification before any construction or utility work. EPA believes that this remedy will effectively remove the possibility of direct human contact with contaminated soils. Eliminating precipitation from moving through contaminated soils will dramatically reduce the chance of further contamination migrating to groundwater.

For off site groundwater, natural attenuation should prevent contaminated groundwater from discharging to Spring Lake Park assuming that there is some control in the source area to prevent additional contaminants from feeding the plume. On going monitoring will provide assurance that the contaminants are attenuating and the park is protected.

The proposed remedies satisfy the following criteria:

- Protection of human health and the environment;

- Attainment media cleanup standards;

- Compliance with applicable standards for management of wastes.

XIII. **PUBLIC PARTICIPATION**

EPA has met with adjacent property owners and other interested residents through participation with the South Omaha Neighborhood Association. These corrective measures alternatives were presented and explained in detail to that group at their November 2, 2000 meeting. At that time, EPA was awaiting additional groundwater data to make a decision on the remedies to be proposed for final corrective actions. EPA is providing the public with another opportunity to comment on the corrective measures described in this document before the remedy decision is finalized. The public is also encouraged to comment on any additional corrective action measures not addressed in the corrective measures study. The public comment period will run from May 12, 2003 to June 26, 2003.

EPA will address comments on an individual basis when possible. A public hearing may be scheduled if sufficient interest is shown, and there is new information which was not considered in EPA's evaluations.

All comments received from the public will be summarized and addressed by EPA in a response to comments. The response to comments will be drafted after the public comment period has ended and will be incorporated into the Administrative Record.

The Administrative Record, which includes this Statement of Basis, correspondence, and reports relevant to the remedy selection, is available for public review at the following locations:

South Omaha Public Library

2302 M Street,

Omaha, NE 68107

(402) 444-4850

EPA Region 7 Library

901 N. 5th Street

Kansas city Kansas 66101

Contact: 1-800-223-0425 or

(913) 551-7241

The public may submit written comments and questions to:

Pat Murrow

ARTD/RCAP

901 N. Fifth Street

Kansas City, Kansas 66101

Toll-free: 1 (800) 223-0425 or directly at

(913) 551-7627

E-Mail--- murrow.patricia@epa.gov

END OF STATEMENT OF BASIS

Table 1

Chemicals of Concern in Soil

Chemical	Maximum Concentration Detected (mg/kg)	Risk Based Concentration [1] (mg/kg)	Soil Screening Level [2] (Soil to groundwater) (mg/kg)	Soil Cleanup Standard [3] (mg/kg)
1,1- Dichloroethene	.780	410	0.06	0.06
Aldrin	240	0.029	0.5	0.029
alpha-Chlordane	40	1.6 [4]	10	1.6
Chloroform	6.5	3.6	0.6	0.6
Dieldrin	48	0.03	0.004	0.004
gamma-Chlordane	97	1.6 [4]	10	1.6
Heptachlor	12	0.11	23	0.11
Heptachlor Epoxide	0.45	0.053	0.7	0.053
Tetrachloroethene	67	1.5	0.06	0.06
Trichloroethene	250	0.053	0.06	0.06

Note:

1) Based on Region 9 Preliminary Remediation Goal table for residential soils

2) Based Region 9 Preliminary Remediation Goal table with a dilution attenuation factor of 20

3) If soil were to be cleaned up to an "any use" level

4) Value for chlordane, which represents a mixture including this isomer, was used as a surrogate.

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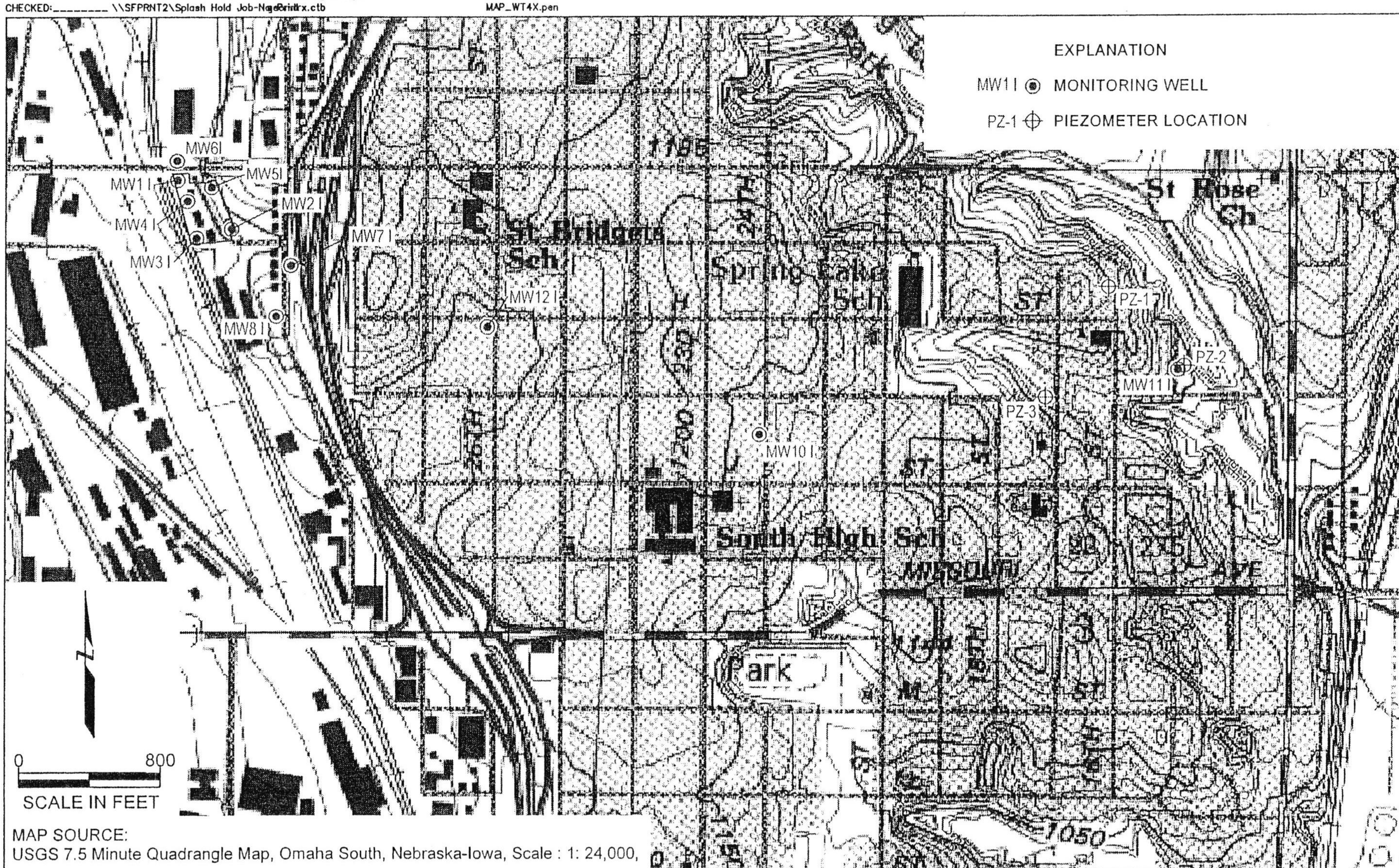

MAP SOURCE:
USGS 7.5 Minute Quadrangle Map, Omaha South, Nebraska-Iowa, Scale : 1: 24,000,

GEOMATRIX

SITE MAP
4120 Buckingham Place
Omaha, Nebraska

Project No.
4132 H

Figure
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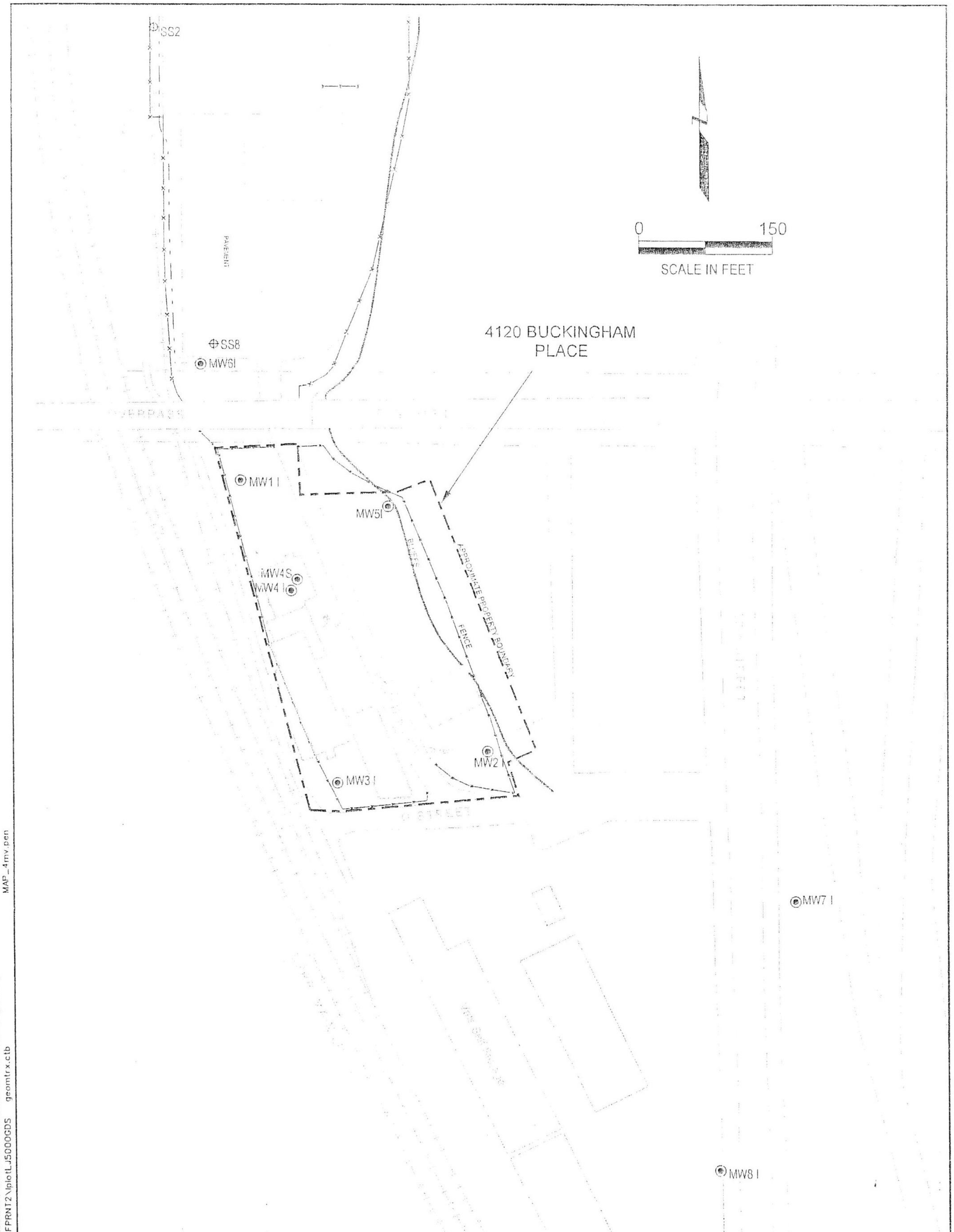

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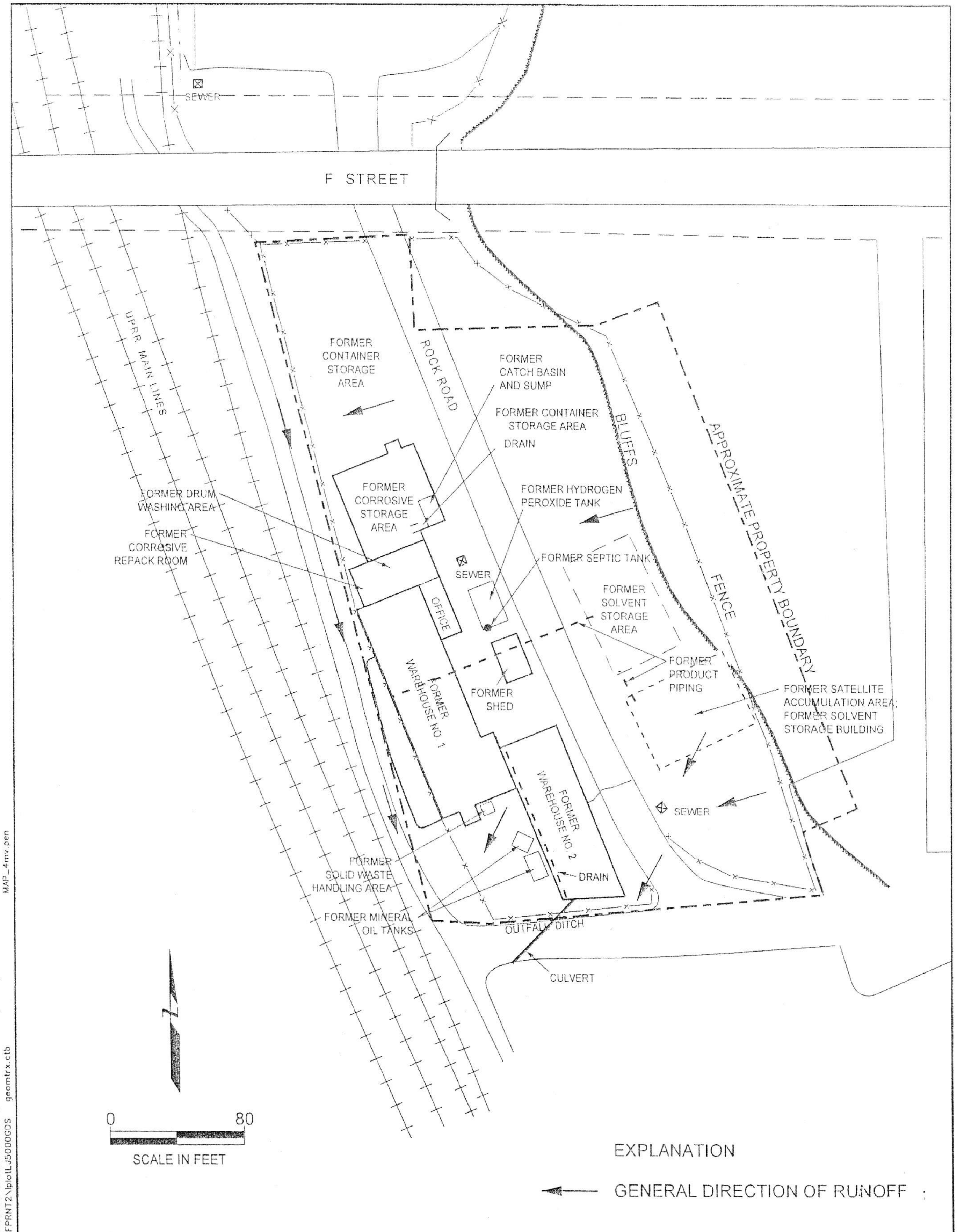
GEOMATRIX

SITE MAP
4120 Buckingham Place
Omaha, Nebraska

Project No.
4133.000

Figure



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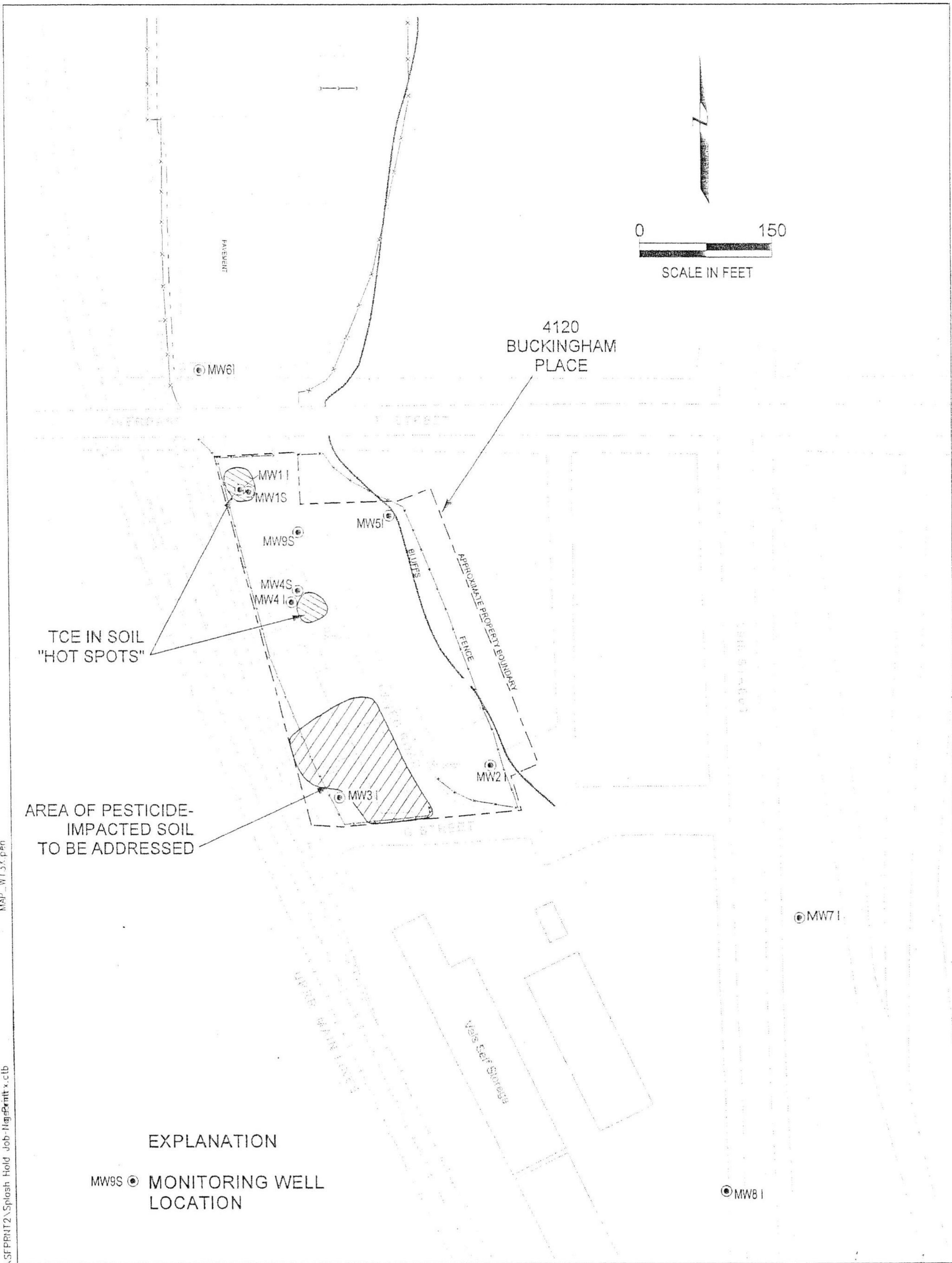
GEOMATRIX

FORMER SITE CONDITIONS
(TO 1989)
4120 Buckingham Place
Omaha, Nebraska

Project No. 4132

Figure 3



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GEOMATRIX

FACILITY MAP
4120 Buckingham Place
Omaha, Nebraska

Project No.
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Figure
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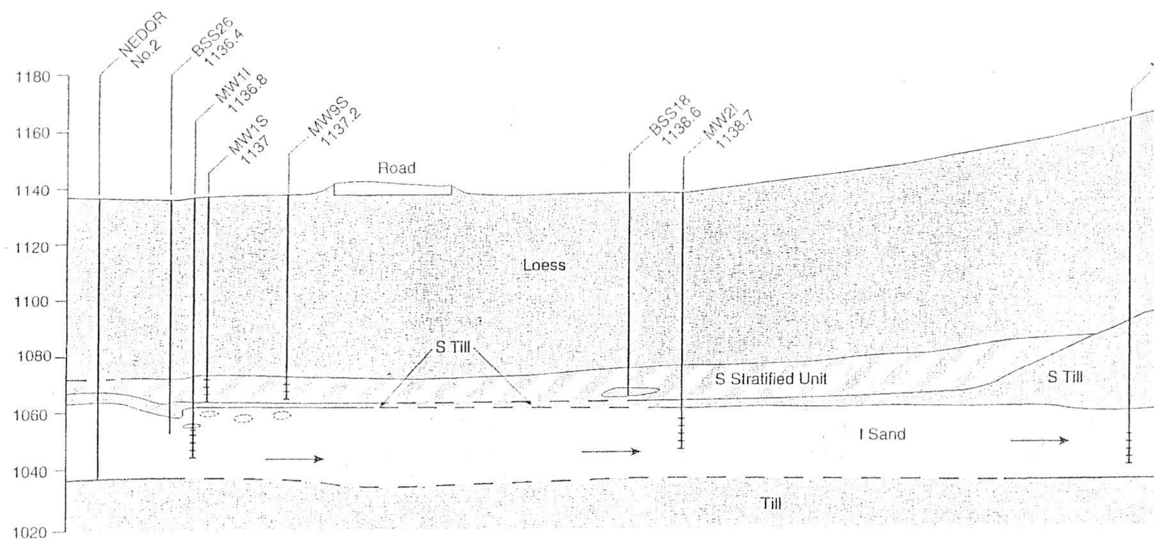
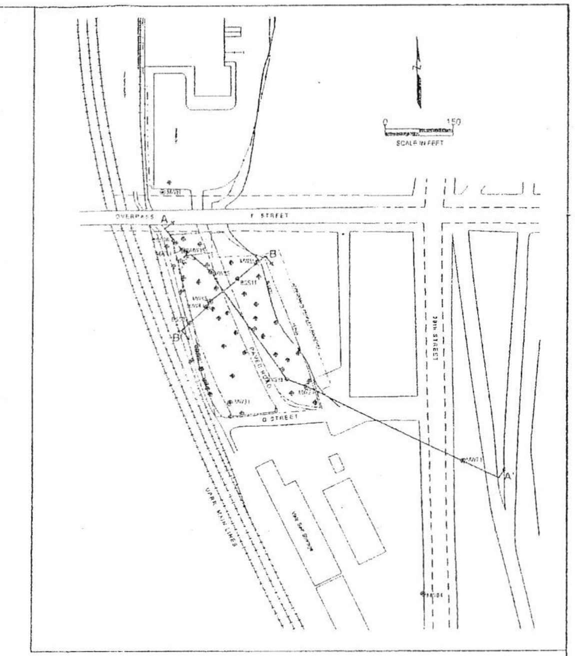
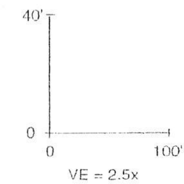


Explanation

Well Screen

Groundwater flow direction





CROSS SECTION A-A'
4120 Buckingham Place
Omaha, Nebraska

GEOMATRIX

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GEOMATRIX

AREA FOR ENGINEERED CAP

4120 Buckingham Place
Omaha, Nebraska

Project No.
4132

Figure
6